

SASSI: Subsystems for Automated Subsurface Sampling Instruments, Phase II

Completed Technology Project (2009 - 2011)



Project Introduction

Autonomous surface sampling systems are necessary, near term, to construct a historical view of planetary significant events; as well as allow for the identification of materials useful for ISRU activities. Paramount to this is exploration missions capable of in-situ analysis of core samples that deliver the stratigraphy of the target. These sample handling technologies must be developed to meet a broad range of potential requirements, including a variety of rock or subsurface materials, rigorous sample preservation requirements, and the general problem of autonomous operation in the presence of dust and with limited resources. Honeybee seeks to develop critical subsystems for a small, low-mass, low-power Rotary-Permissive Corer (RoPeC) capable of autonomous sample acquisition and delivery from a depth of 5 cm. Specific attention will be given to the tall-pole items including the core break-off, retention, delivery, rotary-percussive drive, and gas flushing subsystems. Near term applications include the Astrobiology Field Laboratory and Mars Sample Return missions. Previous coring tool development has focused on integration and far-horizon proof of concepts; resulting in complete systems designed around specific requirements. The path forward lies in maturing specific aspects of designs quickly. The Phase 1 research has resulted in a survey of existing sampling systems as well as a conceptual design of the RoPeC with a focus on modularity. In Phase 2, Honeybee will mature the design of RoPeC subsystems; including the integration of a percussive voice coil actuator developed by the Jet Propulsion Laboratory for the Mars Science Laboratory (MSL) Powder Acquisition Drill System. A focus on modularity will ensure that subsystems can be redesigned independently; enabling the acquisition of core samples in targets including MEPAG suggested rocks, MSL Mars analogs and Phoenix analogs. This will lead to the a TRL of 5-6.



SASSI: Subsystems for Automated Subsurface Sampling Instruments, Phase II

Table of Contents

Project Introduction	1
Organizational Responsibility	1
Primary U.S. Work Locations and Key Partners	2
Project Transitions	2
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

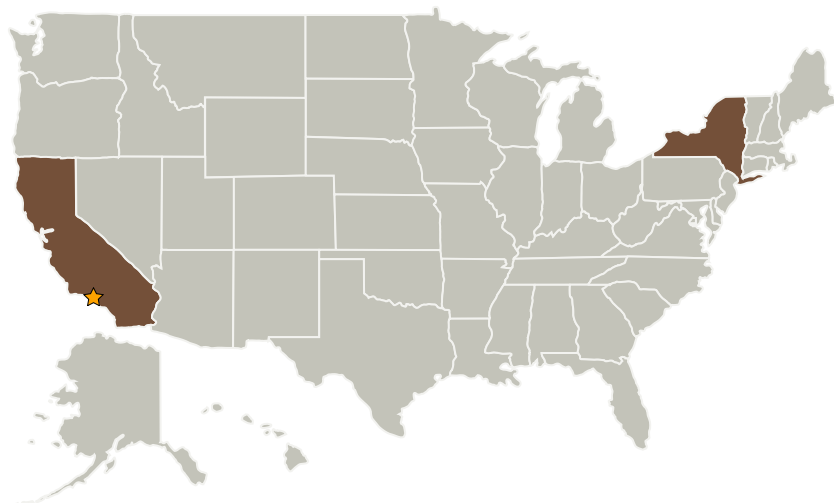
Small Business Innovation Research/Small Business Tech Transfer

SASSI: Subsystems for Automated Subsurface Sampling Instruments,
Phase II

Completed Technology Project (2009 - 2011)



Primary U.S. Work Locations and Key Partners



Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX04 Robotic Systems
 - └ TX04.3 Manipulation
 - └ TX04.3.4 Sample Acquisition and Handling

Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Honeybee Robotics, Ltd.	Supporting Organization	Industry	Pasadena, California

Primary U.S. Work Locations

California	New York
------------	----------

Project Transitions

**January 2009:** Project Start**September 2011:** Closed out